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Science: Black Hole Opens in Scientist Job Rolls

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A generation of physical scientists is learning that the most important rule of nature is the law of supply and demand.

Only a few years ago, the idea of a glut of physical scientists was considered

absurd. Most politicians and educators loudly called for more scientists, citing presumed industrial benefits. Now with industry, academia and government labs curtailing hiring, "no one would say there is a shortage," says Kenneth M. Brown, resources director at the National Science Foundation.

Indeed, the oversupply of physical scientists -- chemists, astronomers, physicists and mathematicians -- could go on for many years. Unemployment among physical scientists is estimated at less than 3%, but the level has doubled in three years. Math and physics show the highest levels of joblessness in nearly 20 years. Chemists over the age of 50 and in the petroleum industry have been especially hard hit, the American Chemical Society says.

At the moment, biologists and related researchers appear to have better prospects than physical scientists. That's because of the maturing of the biotechnology industry and increased government funding on research such as the Human Genome Project, says Betty Vetter, executive director of the Commission on Professionals in Science and Technology.

Among those facing the most dire prospects in the physical sciences are holders of newly minted doctorates. **Nearly 13% of new Ph.D. recipients in mathematics, for instance, are unemployed, the highest level since 1975.**

And even young scientists in such hot areas as computing are finding fewer job offers, forcing them to consider less glamorous posts at industrial labs. "It used to be that the top Ph.D.s coming out of Stanford, MIT and places like that had faculty jobs waiting for

them," says David Liddle, president of Interval Research Corp., a private lab in Palo Alto, Calif.

The situation for scientists is so dire because of three converging factors: cutbacks by corporations that once maintained lavish basic research but are now concentrating on applied development; the sharp decline in funding for some Big Science and military research projects, such as Star Wars and the Space Station; the availability of first-rate scientists from the former Soviet Union.

"We are facing a classic industrial problem," says Rustom Roy, a materials scientist at Pennsylvania State University and a critic of generous government subsidies to scientists. "In the past, we overbuilt capacity. . . . We don't need any more science." Aggravating the situation is the availability of thousands of Russian scientists who work in their native land for as little as \$100 a month. And the best of the Russians are landing faculty posts in the U.S., in many cases edging out U.S. citizens. (A far lesser number from other former Eastern bloc countries are too). Major U.S. universities defend the practice of hiring Russians, even at the expense of qualified U.S. candidates. "We want to hire the best people we can get, period," says Lawrence C. Evans, a mathematician at the University of California at Berkeley.

Science advocates argue that the influx of foreigners strengthens the U.S. They say the difficulties facing many U.S. scientists facing are temporary.

"It's hard to imagine a world where we need fewer" scientists, says Robert Park, an executive with the American Society of Physics who believes the U.S. can always benefit from training more scientists.

But some struggling young physicists might argue with him. Consider Gene Nelson, a 41-year-old physicist in Middleburg Heights, Ohio. Mr. Nelson is an instructor at a nearby community college earning \$300 a week with no fringe benefits. He says he can't find a better job. "I've had people say to me: Rewrite your resume, leave out your Ph.D., and you might get a job," he adds.

In his last job, Mr. Nelson earned \$50,000 a year designing medical diagnostic devices but was let go when his employer canceled his project. He then launched a company to supply handwriting-recognition software for computers but left the business after spending much of his savings. Next he sought engineering jobs, but gave up soon after a company that makes toilets for yachts turned him down for a post as a designer.

Mr. Nelson is qualified for many engineering jobs -- all too qualified. Employers think he has the wrong skills. "I'm nervous about bringing on a Ph.D.," says Ed McKiernan, president of Sealand Technology Inc., the Big Prairie, Ohio, toilet maker that decided against hiring Mr. Nelson. Since Sealand relies on just a few designers, the team must hew to a conventional path. "We're not set up for someone designing a futuristic sanitation device for the 21st century," Mr. McKiernan says. Still, a Ph.D. in physics carries great weight with some companies. **Microsoft Corp.**, a maker of computer software, employs about 50 physics Ph.D.s. But physicists at Microsoft are writing software, not doing physics.

Other physicists have moved into even more remote fields. After a few years of failing to land a permanent job, Kevin Aylesworth abandoned physics in 1992 to take a job with a law firm as a technical consultant. Though he earns more than \$75,000 by "applying some of my specialized knowledge," he is still bitter about his stunted career in physics

and blames the science establishment for creating the false impression that there are not enough scientists to go around.

Unlike Mr. Aylesworth, many newly minted physics Ph.D.s will do almost anything to stay in their field. One common practice is to accept a series of postdoctorate fellowships, originally designed as a hiatus between permanent jobs. Postdocs can receive salaries in the \$40,000 range plus health insurance, but often these slots must be renewed yearly. "It makes me feel like a scientific migrant," says Robert Zacker, a postdoc at the Naval Research Laboratory in Washington.

Mr. Zacker received his Ph.D. in 1987 and still has never held a permanent job in physics, even though he specialized in polymers, one of the least theoretical branches of the field. "It wasn't like I decided to be a poet," he says.

Some physicists have extended their scientific lives by shifting into hot areas of research. John Quackenbush received a Ph.D. in particle physics in 1990, then was shocked when he found it impossible to gain a yearlong postdoctorate fellowship, no less the teaching position he covets. After cobbling together various grants for a year, Mr. Quackenbush began studying molecular biology on a lark. Last year, he landed a five-year post funded by the Human Genome Project, which sought a handful of researchers from other disciplines.

"I'd love to be doing physics," he adds, "but I'm happy to have the privilege of doing science."

--- Abundance of Ph.D.s

Though demand lags for physical scientists, U.S. universities are producing more Ph.D.s. Chart shows the number of degrees awarded in each category.

	1991	1986
Chemistry	2,194	1,903
Physics & Astronomy	1,408	1,187
Mathematics	1,040	729
Computer Science	797	399

Source: National Research Council